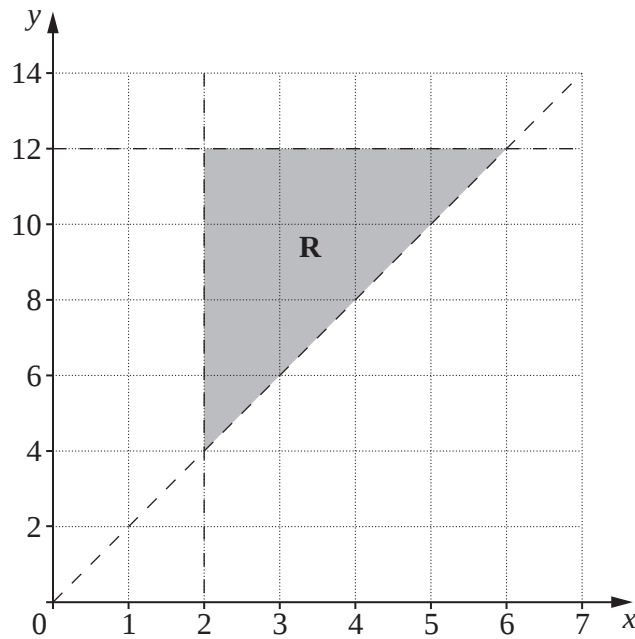


OLEVEL P2

A14 SHADING

INEQUALITIES



The shaded region, **R**, contained **inside** the dotted boundary lines, is defined by three inequalities.

- (a) One of these inequalities is $x > 2$.

Write down the other two inequalities.

[3]

- (b) The points (c, d) , where c and d are integers, lie in the shaded region **R**.

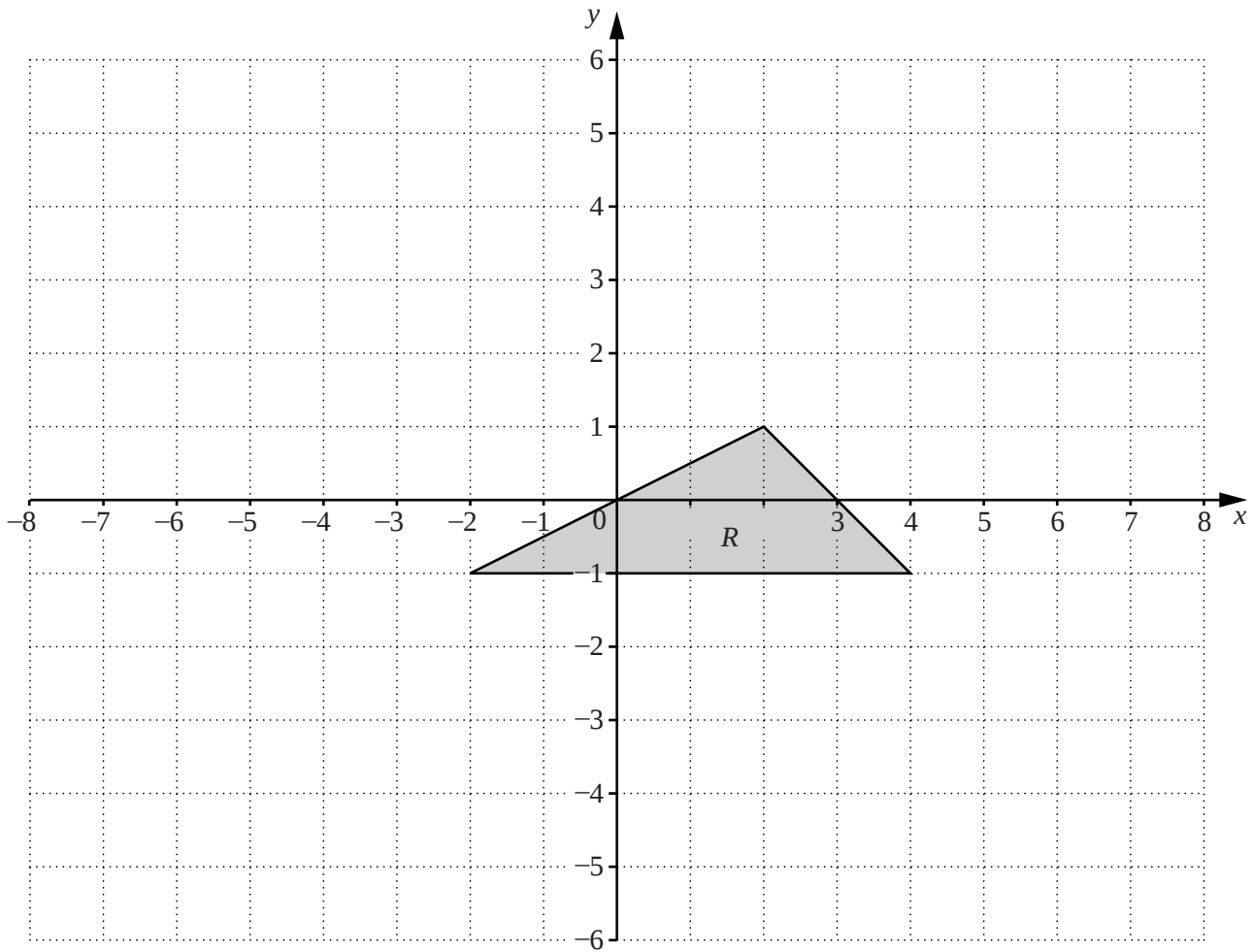
Find

- (i) the maximum value of $c + d$,

[1]

- (ii) the value of d given that $d = 3c$.

[1]



Triangle R has vertices $(-2, -1)$, $(2, 1)$ and $(4, -1)$.

- (a) The gradients of the sides of triangle R are 0 , -1 and k .

Find k .

Answer [1]

- (b) One of the inequalities that defines the shaded region is $x + y \leq 3$.

Write down the other two inequalities that define this region.

Answer

..... [2]

(c) Triangle R is mapped onto triangle P by a reflection in the line $y = -2$.

Draw and label triangle P . [2]

(d) Triangle R is mapped onto triangle Q by a stretch where the invariant line is the y -axis.
This transformation maps the vertex $(2, 1)$ onto $(4, 1)$.

(i) For this stretch, state the scale factor.

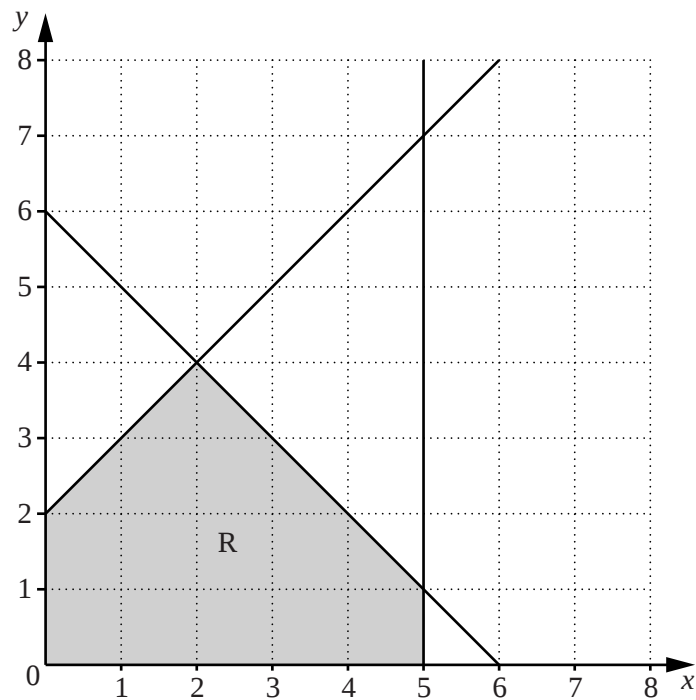
Answer[1]

(ii) Find the coordinates of the vertex $(4, -1)$ when it is transformed by this stretch.

Answer (..... ,) [1]

(iii) Find the area of triangle Q .

Answer units² [2]



The diagram shows a shaded region R.

- (a) Write down the name of the shaded polygon.

Answer [1]

- (b) Three of the inequalities that define the region R are $x \geq 0$, $y \geq 0$ and $y \leq x + 2$.

Write down the other two inequalities that define this region.

Answer

..... [2]

- (c) On the diagram draw the line that is parallel to $y = x + 2$ and passes through the point (5, 0). [1]

- (d) Find the gradient of the line that is perpendicular to $y = x + 2$.

Answer [1]

- 4 (i) Shade and **label** the region R defined by these four inequalities.

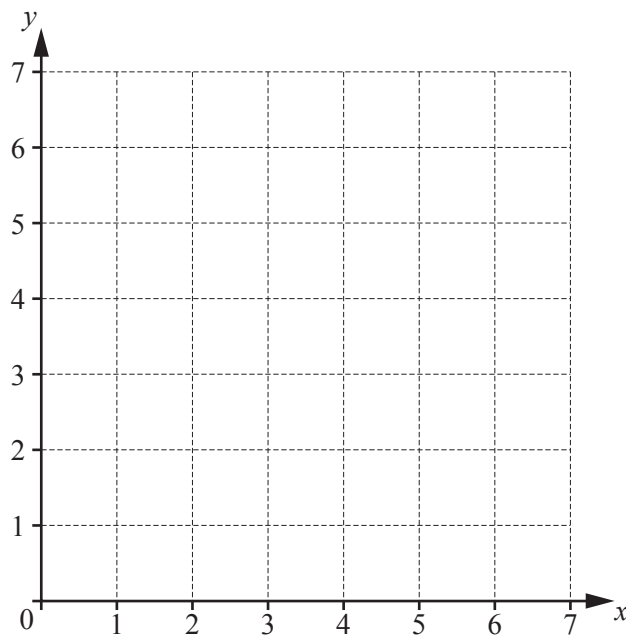
$$x \geq 1$$

$$y \leq 4$$

$$x + y \leq 6$$

$$y \geq x$$

Answer

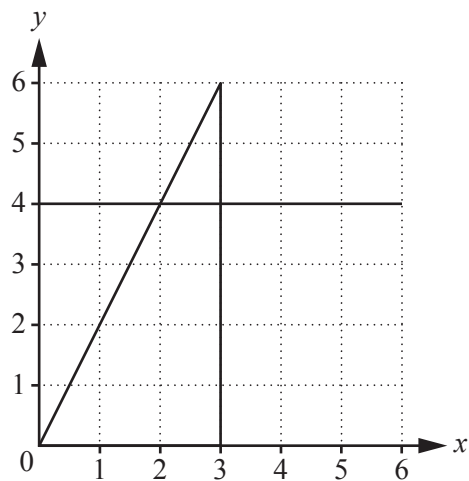


[3]

- (ii) The point M is the intersection of $x = 1$ and $y = 4$.
The point N is the intersection of $x + y = 6$ and $y = x$.

Find the gradient of MN .

Answer [2]



(i) Draw the graph of $x + 2y = 5$.

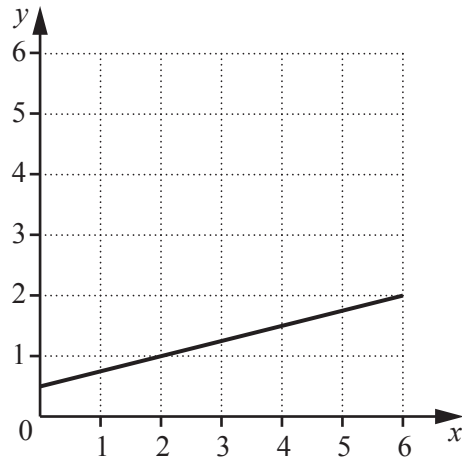
[2]

(ii) Shade the region defined by these inequalities and label it R.

$$x \leq 3 \quad y \leq 4 \quad y \leq 2x \quad x + 2y \geq 5$$

[1]

6 (a)



The grid shows the line $4y = x + 2$.

By drawing appropriate lines, indicate the region R defined by all these inequalities.

$$x \geq 1 \qquad x + y \leq 5 \qquad 4y \geq x + 2 \qquad [3]$$

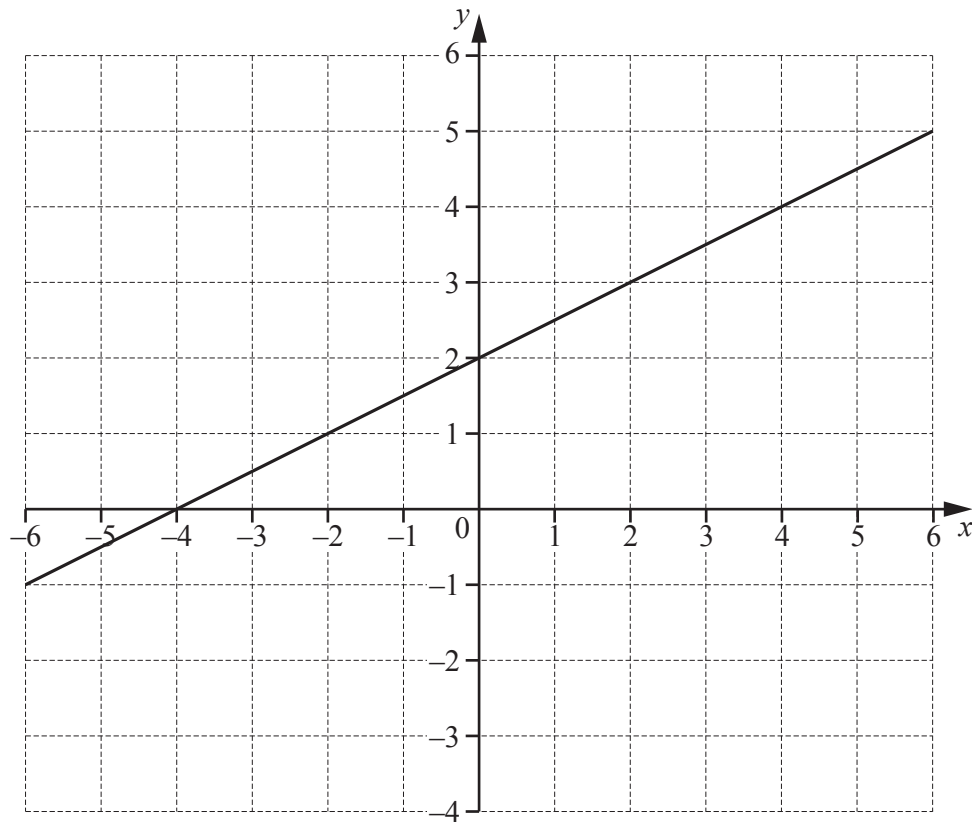
(b) A is the point $(-1, 3)$ and B is the point $(5, 5)$.

(i) Calculate the length AB .

Answer [2]

(ii) Find the equation of the line **perpendicular** to AB that passes through the midpoint of AB .

Answer [4]



The line $2y = x + 4$ is drawn on the grid.

(a) (i) On the grid, draw the line $x + y + 2 = 0$.

[2]

(ii) The region R is represented by these three inequalities.

$$\begin{aligned} 2y &\geq x + 4 \\ x + y + 2 &\geq 0 \\ y &\leq 2 \end{aligned}$$

On the grid, shade and label the region R.

[2]

- (b) Line L is perpendicular to the line $2y = x + 4$.
Line L passes through the point $(1, 8)$.

Show that the equation of line L is $y = 10 - 2x$.

[3]

- (c) Use an algebraic method to find the coordinates of the point of intersection of the lines $2y = x + 4$ and $y = 23 - 2x$.

Answer (..... ,) [3]

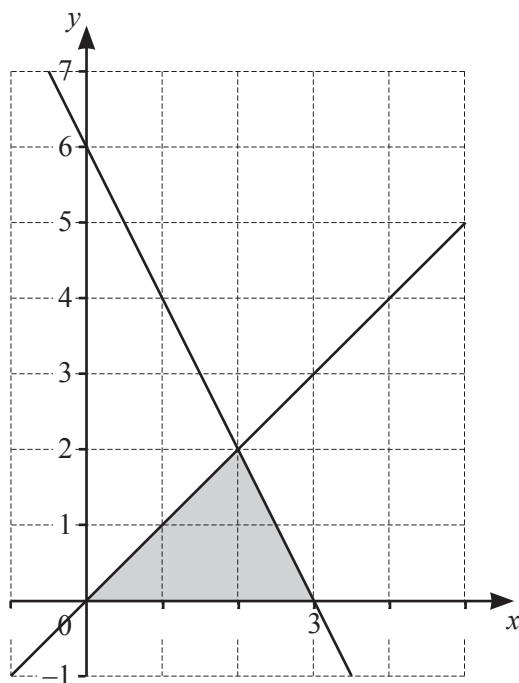
8 (a) (i) Solve the inequality $10 < 3(x+1) \leq 24$.

..... [3]

(ii) State the number of integers, x , satisfying $10 < 3(x+1) \leq 24$.

..... [1]

(b)

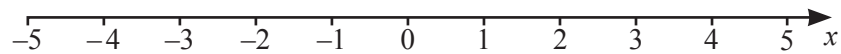


Find the 3 inequalities which define the region **shaded** in the diagram.

.....

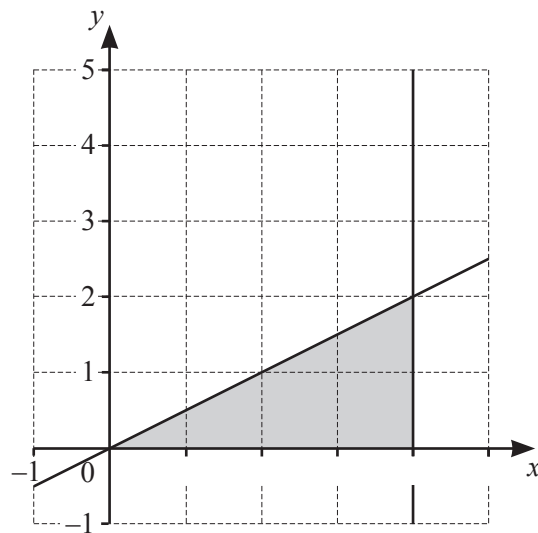
 [3]

- 9 (a) Represent the inequality $-3 < x \leq 2$ on the number line below.



[1]

(b)



Find the 3 inequalities which define the region **shaded** in the diagram.

.....

.....

..... [3]

- (c) Solve $-12 \leq 4(m-2) < 10$.

..... [3]